Strathcona Remote Control Flyers Association

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New Member's Orientation Package

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While care has been taken to ensure the accuracy of the information presented in this manual, the reader is advised that the author(s), reviewer(s), and contributor(s) cannot be responsible for the continued currency of the information or for any errors or omissions or for any consequences arising therefrom.

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New Member Orientation Information

Purpose

The purpose of this manual is to acquaint new members to the Strathcona Remote Control Flyers Association (SRCFA) and to the hobby of flying remote control aircraft. Another very important objective of this manual is to stress the safety precautions required to minimize the probability of anyone getting hurt while enjoying this great hobby. **Remember the safety of you, your fellow club members, and the spectators depend on you understanding and following this manual.** Please read it thoroughly as the information enclosed is pertinent as to how the SRCFA Model Airport and in part how the SRCFA is safety operated. If you want additional information please consult the SRCFA website at www.srcfa.ca or contact one of the club executive. This package has been based on the Model Aeronautics Association of Canada (MAAC) guidelines and the SRCFA documents, which are the Association's Objectives, By-Laws, and Standing Resolutions. In the event there is a conflict between this package and the SRCFA Objectives, By-Laws, and Standing Resolutions, the SRCFA Objectives, By-Laws, and Standing Resolutions shall be deemed correct.

Administrative Details

When you join the SRCFA you not only join our club, but will also be required to join the Model Aeronautics Association of Canada (MAAC). In order to fly at any SRCFA Model Airport or any SRCFA sanctioned event you must be a current member of MAAC. Be advised when you join MAAC and sign the application form you are agreeing to conduct your flying activities in accordance with the MAAC Safety Code. A copy of this document is available on the MAAC web site. www.maac.ca.

Model Aeronautics Association Of Canada (MAAC)

The SRCFA is a Charter Member of MAAC which allows the Association to collect MAAC dues. A person who remits the MAAC fees to the Association is immediately an active and current member of MAAC. The MAAC membership entitles you to a number of benefits including a magazine on a bi-monthly basis. MAAC represents the modeling community when dealing with the Federal and Provincial Governments, and have through lobbying, supplied us with the dedicated frequencies that we now enjoy today. However by far the greatest benefit is the Public Liability and Property Damage Insurance Policy which all MAAC members receive. This policy protects you, and the other members of the Association, the Association, and the landowner from any incident that may occur relating to flying activities. Flying Clubs worldwide recognizes this policy. Unfortunately, this policy does not cover the loss of a model due to crashing or other misfortunes.

For additional information, please refer to the MAAC website at www.maac.ca.

Association Membership

The SRCFA is a recreational club composed of individuals ranging from the ages of 10 to 80 who all enjoy the hobby of flying remote control aircraft. As with all clubs there are "rules" which dictate how the Association is operated and the appropriate conduct of its members. For the SRCFA these documents are the SRCFA Objectives, By-Laws, and Standing Resolutions. It is your responsibility as an Association member to read, understand, and follow the association protocols identified in these documents. As with most clubs or Associations, admission to the membership allows for certain rights and privileges. The greatest privilege to members in good standing is the use of any SRCFA Model Airport(s) on a regular basis for the purpose of modeling. Guests who are current MAAC members may be allowed to fly under the sponsorship and supervision of a SRCFA member as outlined in the Association's Standing Resolutions. Inexperienced pilots must be accompanied by a Wings Instructor for all flights until they have passed the basic "Solo" flight and are judged to be capable of safely handling the aircraft on their own.

The club typically meets on a monthly basis to discuss the operation of the Association. All members and perspective members are welcome at these meetings. Contact one of the club executive or refer to our website for meeting dates, times and locations.

Transmitter Impound And Frequency Control Board

To protect you as an individual and the other flyers at the model airport the SRCFA uses two levels of protection when dealing with radio transmission. Upon arrival at the model airport your first responsibility is to place your transmitter in the Transmitter Impound. When not in use your transmitter must be "off" and impounded during the duration of your time at the model airport. The only time that a transmitter can be turned on is when the frequency is available for use (i.e. a pin is not on the applicable frequency nor on the frequency immediately prior to or after the applicable frequency) and you have placed your pin on your applicable frequency. The frequencies in use are indicated by the use of a "Frequency Pin" which has been clipped to the frequency board channel. **Anyone causing a crash through interference with a person rightfully using the frequency will be held responsible for the damage caused, and must replace, repair, or pay for the damage**. The SRCFA Executive Committee will decide responsibility; in all cases the Committee decision is final.

The SRCFA Frequency Control Board displays all of the post 1991 frequencies available for use by the R/C modeller. It is broken down into two parts Aircraft and Surface models. The use of an Aircraft frequency for a surface model or vice versa is not allowed. To use the Frequency Control Board, each member, and visiting pilots must have a separate identification pin for each transmitter. The size and information required on the Frequency Pin is indicated at the end of this subsection. When it is your turn to fly or if you want to turn on your transmitter for other reasons,

you must first place your pin on your frequency on the frequency control board. **The pin must be centered on your frequency. If another pin on the board does not allow this, you MUST NOT turn on your transmitter until its owner has removed the other pin. Under no circumstances should you remove another persons pin even if requested by that person**. Pins must not overlap each other on the board. After your flight is over, you must remove your pin from the board. Remember that you are preventing the use of at least three frequencies while your pin is on the board. If both transmitters are post 1991 technology (i.e. using narrow band technology) **and** an agreement can be made between the transmitter owners during a flying session then this rule (i.e. no buffer channel between flyers) can be waived.

Only a maximum of four aircraft may be flying at any time. No more than six pins are allowed on the frequency board at any one time (i.e. Four pins for flyers and two pins for those getting ready to fly).

Transmitter Identification

It is good practice to have the channel number displayed on the transmitter antenna with the black-on-white numbers supplied by the manufacturer. This provides a visual check for all fliers as to what frequencies are in use, and also provides a way to double check that the frequencies on the board are properly pinned out. It is also a good idea for the transmitter to have a ribbon fastened to the tip of the antenna. This allows the flier to check the wind direction during flight, and prior to landing, a clearly marked antenna

tip, can prevent accidentally poking it into a rotating propeller or a fellow modeller's eye.

Channel 35 And Channel 36

Channel 35 is on the bottom of the left hand column of the frequency board and Channel 36 is on the top of the right hand column, visually they appear to have adequate separation, electronically however this is not the case. They are in fact adjacent frequencies and are subject to the 20 MHz rule. If you own a Transmitter on Channel 35 you will have to pin out ½ of Channel 34 all of Channel 35 and ½ of Channel 36. If you own a transmitter on Channel 36 you will have to pin out ½ of Channel 35 all of channel 36 and half of channel 37. Owners of these transmitters will require two pins for each transmitter.

Narrow Band Transmitters

All R/C Radio equipment manufactured and distributed in North America after 1991 uses narrow band technology. This technology will allow adjacent frequencies to be used simultaneously, however the SRCFA recommends a spacing of one channel 20 MHz between each operating transmitter. **Pre 1991 transmitters (i.e. non narrow band transmitters) cannot be used at any of the SRCFA facilities**. Through mutual consent, flyers that want to use adjacent channels at the same time may due so providing both of the transmitters are using the narrow band technology.

The Relationship Between Your Frequency and Channel Number

There is a relationship between the frequency your transmitter is transmitting and the channel number for the typical 72 MHz aircraft transmitters. Once memorized, you will be able to convert within a few seconds in your head. You can then amaze your friends as you call out their correct channel number from just hearing the frequency!

If you know the frequency and want to calculate the channel:

1. Take the hundredths from the frequency (72.810; use just "81")
2. Subtract 21 (81-21=60)
3. Divide by 2 (60/2=30)
4. Add 21 (30+21=51)
5. You're done. The answer is channel 51

If you know the channel and want to calculate the frequency:

1. Take channel number (51)
2. Subtract 21 (51-21=30)
3. Multiply by 2 (30x2=60)
4. Add 21 (60+21=81)
5. Put 72. in front of the answer
6. You're done. The answer is frequency 72.810

By remembering these conversions, the answer is immediately available when needed.

The Use of Frequency Pins

The SRCFA uses one basic distinct Frequency Pin for Post 1991 transmitters (i.e. narrow band transmitters). It is mandatory that all flyers have and utilize a frequency pin. Pins shall be fabricated in accordance to the next section.

All Frequency Pins must clearly display at minimum the following information:

- **Your Name**
- **MAAC Number**
- **Frequency Channel.**

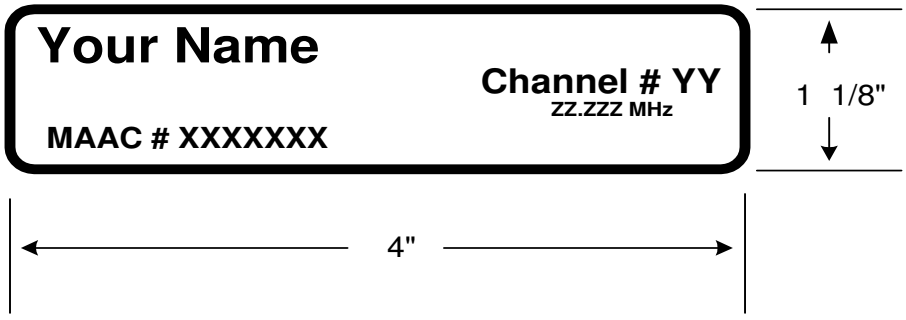
Pins can be made from Formica, plywood or any other suitable material. A common clothespin works very well for an attachment mechanism. The clothes pin also will allow clipping of the pin to the antenna thus identifying the transmitter while it is in the impound. The information on the pin must be of a permanent nature and legible. The SRCFA require that each transmitter have its own frequency pin.

Aircraft Transmitter Frequency Pin Requirements

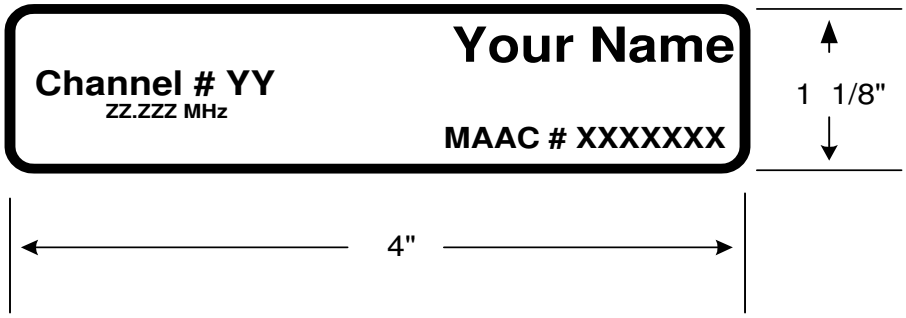
Frequency pins must be fabricated as identified on this page and must comply to the size dimensions below.

Where XXXXXXX is your MAAC identification number, YY is the frequency channel of your aircraft transmitter. (Optional - ZZ.ZZZ is the frequency)

For Aircraft Channels 11 to 35



For Aircraft Channels 36 to 60



The frequency pin can be made from plastic, arborite, or any suitable material. A common spring type clothes pin shall be glued to the back of the above tag. This allows the pin to be clipped to the frequency board or the transmitter antenna when the transmitter is not in use.

One pin is required for each transmitter you own!

Antenna Courtesy

The flier should, as a courtesy to others, keep the transmitter antenna collapsed while in the pits, and extend the antenna only when about to taxi onto the field. A further benefit of this practice is that, with the antenna collapsed, an interfering signal will probably cause servo chatter or random movement of control surfaces as the pilot prepares to start his engine, allowing him to notice the interference before starting his flight. This could well avert a crash.

SRCFA Flying and Safety Rules

The Association Flying and Safety Rules are identified in Section 8 of the SRCFA Standing Resolutions. You must read these and understand them prior to using any of the Association's facilities.

It should be noted that at the SRCFA Science Park Flying Field there is a frequency restriction in place. The frequency channels of #11 to #20 inclusive will be for the sole use of the Slope Soaring group and will be used at the North end of the facility. The frequency channels of #22 to #60 inclusive will be for the use of the Powered Flying group and will be used at the main flying site. The frequency channel #21 will not be used at either site and will act as a buffer between the two allocations. Frequency control will be in effect at both locations at all times. It should be noted that other SRCFA Flying Field do not have any frequency restrictions.

SRCFA General Rules

The Association Flying Field General Rules are identified in Section 7 of the SRCFA Standing Resolutions. You must read these and understand them prior to using any of the Association's facilities.

Noise and Mufflers

Noise, caused by propellers and engine exhaust is the biggest contributors to the loss of model airports. As a member of this club you will be responsible to ensure that your engine it not excessively noisy. You should spend some time to ensure your model set up minimizes noise (i.e. engine and muffler set up and the propeller sizing). See the Appendix for more background on R/C noise and a technical commentary on model sound/noise.

To be a responsible neighbour our club has set some noise rules for all aircraft flying at any SRCFA facilities. The maximum allowable noise level for a model is dictated by the time of day. As you can expect the most sensitive time of the day for our neighbors is typically morning or evening. For this reason our allowable sound levels are typically less at that time of the day. **All aircraft must be tested for noise prior to flying at a SRCFA facility.** The noise testing standard is 7.5 meters on the right side (viewed from the rear) of the aircraft while on grass. Helicopters shall be hovered approximately 1 meter off of grass for the test. For details on noise rules please refer to the SRCFA Standing Resolutions Section 11A.

General Protocol

The MAAC Etiquette Code, the MAAC Safety Code, and the SRCFA rules apply at all SRCFA facilities. **These codes and rules have been established or adopted by the Association to maximize the safety of members and spectators and also aid in the enjoyment of the sport.**

Note that the following list is only a summary of the most significant club rules:

1) MAAC membership (or a MAAC recognized affiliated membership) is mandatory to fly at the fields. Flyers shall conduct themselves in accordance to the MAAC Safety Code Rules.
2) All transmitters MUST be stored in the Transmitter Impound.
3) Flyers MUST pin out PRIOR to turning on their transmitter.
4) No flying is allowed over the pit, parking lot, or the compound area.
5) No taxiing is allowed into the pit area.
6) Only the flyer that placed a pin on the control board may remove it.
7) A maximum of four (4) flyers may be pinned out and flying at the same time with an additional two (2) pins allowed on the control board for pre-flight preparation work only. Thus a

maximum of six (6) pins are allowed on the control board at one time.

8) Flyers shall perform a range check prior to the first flight of each day.

9) Aircraft must be pointed at the runway for engine start up.

10) All flights must start and end on the active runway as designated by the yellow arrow.

11) Each flyer shall announce his/her intentions prior to entering the runway, taking off, landing, etc.

12) Low passes must be beyond the runway centerline.

13) Flyers are limited to a frequency for a maximum of fifteen (15) minutes.

14) Cellular phones are not allowed at or near the flight line (i.e. not past the pit area).

15) It is mandatory to use a restraint (or second person holding the aircraft) while starting a fixed wing aircraft with an internal combustion engine.

If a gentlemanly agreement cannot be kept regarding the flying order a written list will be started. Flyers will add their name to the list and as their turn to fly comes they will cross out their name from this list. If the person at the top of the list has a frequency conflict with another pilot already flying, he will pass his turn to the next pilot on the list but will stay at the

top of the list until such times, as his frequency is clear. If you are unable to fly for any other reason when your turn comes you should not hold up the frequency longer than necessary. Pilots may only have their name on the list once and cannot add it again until after they have flown. During high traffic times such as an Open House the Transmitter Impound and Frequency Board will be managed by a club member.

Active Runway

The active runway (i.e. the runway currently being used for take offs and landings) is denoted by the Yellow Arrow placed in the pit area just in front of the pilot stations. The arrow is placed to denote the direction of takeoff and landing (i.e. the arrow should be pointing into the wind). Changes to the arrow direction are made as required with the mutual consent of the pilots using the Model Airport at the time.

Section
3

SRCFA Wings Program Information

Introduction

The Strathcona Remote Control Flyers Association (SRCFA) welcomes you to the fascinating world of Radio Control modeling. Perhaps your most important step was taken some time ago, when you decided to purchase and build a radio controlled model aircraft. If you have not taken this step yet the SRCFA suggest that you join a club and get some assistance before you commit to purchasing any equipment. During the purchasing or the building stage it is always a good idea to have a resource person that you can contact for assistance. It will you save time and money. You will find that this help is readily available. You may wonder whether this is a wise thing to do since you cannot be sure that you will enjoy the business of flying model aircraft. Let us assure you that once you begin to operate your own model that there are very few experiences like it. Many thousands of people worldwide have found that this is not just a hobby, but that it turns into a lifelong passion. Like most of life's experiences, learning to fly is an adventure into the unknown.

Note that it is highly recommended that you bring this manual to the flying field when you are learning to fly. It will allow the instructor to highlight items that will help you learn to fly.

Recommended Aircraft Items To Purchase For Beginners

As with all new experiences, new comers to our hobby have many questions on what they should buy in order to get started. To help the beginner with initial equipment selection the SRCFA has put together a basic recommended list of equipment, which based on our experience will provide you with quality hardware and minimal frustration. For additional details on your purchase it would be advisable to discuss your budget with an instructor so that they can tailor the set up for you.

It should be noted that aircraft come in two basic types. The first is a basic kit form where you build the aircraft to the plans provided in the kit. Most of the items needed to build the aircraft are included however typically you will need to purchase $50 to $75 worth of extra items (i.e. glues, covering, etc) to complete the project. The second type of kit is an ARF (Almost Ready to Fly) kit. This type of aircraft is basically assembled and covered for you. The amount of work required to finish the model is minimal.

As you will see it will cost approximately $760+ ($710 plus GST) in order to purchase the mandatory items required to get started in this hobby. Should you require clarification on any of the above it is recommended you talk to one of the club instructors or one of the club executive.

Recommended Items For Beginner Flyers

	Item	New Appox. Cost (GST Excluded)	Mandatory Or Optional
1)	4 channel or greater Aircraft Transmitter (**with buddy box capabilities**) with a minimum of 4 servos, wall charger, and batteries (recommend channel between 22 & 60)	$230+	Mandatory
2)	High wing trainer aircraft constructed from wood and covered with an iron on covering (SIG LT-40, Great Planes perfect trainer 40, Hanger 9 Alfa trainer are all good choices)	$205 (ARF)	Mandatory
3)	Glow fuel engine (OS 46FX and the Thundertiger 46 are proven engines and are recommended)	$160	Mandatory
4)	2 Spare propellers (11 x 7 Master Airscrew)	$14	Mandatory
5)	2 Spare Glow Plugs	$13	Mandatory
6)	Fuel Can Fittings (Dubro #192)	$5	Mandatory
7)	Propeller and Glow plug wrench	$7	Mandatory
8)	Glow fuel pump (hand) or	$15	Mandatory
9)	Glow fuel pump (electric)	$25	
10)	5 ft of fuel tubing	$10	Mandatory
11)	1 Gallon of 5% or 10% sport glow fuel (the lubricant should be part castor oil)	$22	Mandatory
12)	“Chicken stick” or	$6	Mandatory
13)	Electric starter	$50	
14)	Glow driver (stand alone) or	$22	Mandatory
15)	Glow driver (driven from power panel) – To use this you would require a power panel and a 12V battery	$22	
16)	Power Panel or flight panel	$35	Optional
17)	12 Volt 7Ahr Gel Battery	$40	Optional
18)	Expanded Volt Meter	$23	Optional
19)	Flight Box	$60	Optional
20)	Assortment of tools (i.e. screw drivers, ¼” drive socket set, pliers, crescent wrench, etc)	N/A	Mandatory

It should be noted that some manufactures make a combined package, which typically contains most the items you need to get started (i.e. ARF plane, engine, 4 channel transmitter, receiver, “slow” wall charger, and four servos).

Learning To Fly

You must approach flight training with a determined and somewhat aggressive attitude. This will be an exciting period for both you and the instructor you will call upon to guide you. You should be aware that it could take you up to 30 hours to be proficient enough to fly safely on your own. An average flight is in the order of ten minutes. On a typical flying day you can get as many as 4-5 flights safely on your battery pack prior to needing to recharge. It is easy to see that you will need between 60-180 flights to learn how to fly depending upon your natural ability. If you can get to the field only on weekends, you can expect the time required to learn to fly is not likely to be less than six weeks and is more likely to be in the order of four months, with flying weather also a major consideration. This assumes that you can be consistent in pursuing your goal and that the usual learning problems and damage to your aircraft during this phase is minor and can be repaired within a couple of days. This can be a frustrating time for you as a fledgling pilot, but do not despair. You will solo, it will just take some time. If you are reading this introduction and are contemplating learning to fly on your own, the SRCFA would advise you against it. Join a club and get proper instruction from competent flyers, it will be less expensive and frustrating in the long run.

Getting Started

In order to learn to fly you will have to team up with a Wings Instructor. Contact the Chief Flying Instructor for a list of Instructors. The SRCFA has a large cross section of Instructors, some are retired, and others work and can only instruct at night or on the weekends. It is best to choose an instructor that will mesh with your day to day plans. Once you have decided on an Instructor contact him/her and see if you can be fitted into their schedule. Once you have found an Instructor, set up some sort of a schedule so that your and the Instructors time is utilized to the best degree. Just to reiterate if you join a club and purchase your equipment after joining, your Wings Instructor could also be your resource person when building your new model. He/she can guide you through those tricky building situations and make the pre flight a simple formality.

The Wings Instructor

Your Wings Instructor is a **volunteer**, approved by the Association Executive or the Chief Flying Instructor based on a few factors. The first and most important is flying ability and adherence to the Safety Rules. The second is the ability to pass this information on to the student in a positive and supportive manner. When looking for Wings Instructors, the SRCA does not expect the most proficient flyer in the club to join the ranks of Instructor. There are some pilots at any field who will test fly your scale or super speed job or anything else you might posses, but this is not in the Wings Instructor mandate. Some of our Wings Instructors may not be

willing to do the test flight on your aircraft since this can be a difficult and stressful task. However, once the initial difficulties with the airplane have been sorted out, these same Wings Instructors are capable and have the required skills to teach you to fly the model. It is equally important to realize that there are limits to the ability of everyone. Most problems with aircraft are experienced within the first few flights. If during a flight a problem is encountered the SRCFA Wings Instructors will do everything within their power to prevent a crash. Their actions may not prevent the crash, but it may well lessen the damage.

Students Skill Level

The Wings Instructor will tailor your training based on your skill level. To a large degree this will be determined during your initial flying session. In most cases the biggest obstacle to overcome is the ability to control the aircraft when it is coming towards you. There are a number of helpful hints to assist the new student; the most popular is to move the aileron stick towards the low wing. As the student's confidence and ability grows the Instructor will advance to the next level in the program. During all of the flying sessions the Instructor will keep a dialogue going explaining to the student what is going on and the reasons for the actions taking place. The student should also question the actions of the Instructor. Remember there are no silly questions. If you are not sure please ask. Your best chance for success is to follow the advice of your instructor.

Typical Pre-flight Inspection For New Aircraft

For the last while you may have spent many evenings and possibly weekends building your Radio Controlled Aircraft. It has finally arrived at the model airport ready for its mandatory pre flight inspection by one of the Flight Instructors. Pre-flight inspections of new models work from one end of the aircraft to the other, inside and out. It must be acceptable in all areas. Hinges must be tested, glue joints tested for strength, wings and fuselages for warps, the model for balance and a host of other things. If the Instructor can break the rudder of the vertical fin with a simple test, then it will break off in flight and will ultimately destroy the model. The pre-flight will test all mechanical aspects of your installation. If problems are found, the instructor will not pass it or fly it. Comprehensive radio range checks are carried out on all new models before the maiden flight. During this inspection be prepared to answer some questions about the way your model is assembled. More than likely you will be asked to make a list of your models short comings and repair them before the model can be certified to fly. Included in this manual is a Pre Flight Inspection Form. If you are sent home with a list of work please do not despair, the Instructor is protecting your investment, and also the safety of the other flyers. He/she also wants your initial flight experience to be a positive one, and not marred by hardware problems with your aircraft. Remember R/C aircraft are a collection of parts assembled in a prescribed manner and if not installed correctly the outcome could end up being a very expensive crash. Pre-flight testing of your model is done on an ongoing basis. In fact

we should add another inspection called the Post Flight Inspection, after the final flight of the day it is a good idea to check things out as you clean up your model. Make note of any deficiencies and repair them before you come out for another flying session. That way you should have no surprises when you do your next pre-flight.

Typical Pre-flight Inspection for A New Aircraft

It is mandatory that new students read and understand the MAAC Safety Code and the MAAC Safety Guidelines for Field Operations. In addition you also need to have read and understood the SRCFA Safety Rules and Regulations as identified in the Association Standing Resolutions.

Aircraft General Inspection

Electronic Gear

Servo's

- Mounting Solid and Secure?
- All Screws Installed?
- Grommets in Place?
- Servo Wheel Screws installed?
- Servo lead routing?

Switch Installation

- Solid and Secure?
- Opposite side of exhaust outlet?
- Switch lead routing?

Receiver and Battery Pack

- Mounting Solid and Secure?
- Vibration protection adequate? (i.e. wrapped in foam)

Antenna

- Routing away from servo's
- Strain Relief in fuselage.
- Extended to maximum length.
- Attachment to external surface, strain relief.

Fuel Tank

- Determine how it is plumbed
- Is it adequately supported?
- Has it been pressure tested?
- Vibration protection adequate? (i.e. tank wrapped in foam to prevent fuel foaming)

Engine

- Is it mounted correctly?
- Are all the mounting bolts installed?
- Are all the mounting bolts tight?
- Are the muffler bolts tight?
- Is there a pressure fitting for the fuel tank?
- Are the Prop Size and Pitch OK for the engine?
- Has the propeller been balanced?

- Is the prop nut tight?
- Is the spinner on securely if fitted?
- Are all bolts and nuts tight?

Push Rods and Linkages

- Are the push rods securely attached to the servo wheels?
- Are the push rods securely attached to the control surfaces?
- Are there keepers on the clevises if fitted?
- Are there other forms of retainers on the clevises if fitted?
- Are the push on type connectors securely attached?
- Is there adequate push rod material in the clevises?
- Are push rods/nyrods properly supported?
- Do they rub against each other?
- Is the action smooth and with little friction?

Airframe

- Is the covering securely attached?
- Is the covering reasonably tight?
- Is the covering of high contrast for easy viewing?
- File flat spots on wheel axles for wheel collar screws.

Wing mounting and Control Surfaces

- If the wing is attached with rubber bands are the dowels long enough to ensure that the bands will stay in place?
- Are there a minimum of 10 rubber bands holding the wing on?

- If mounted with bolts are the blind nuts, if used, installed correctly?
- If mounted with ¼ inch bolts are the mounting plates and wood nuts installed correctly?
- If a leading edge dowel or dowels are used are they attached securely?
- If the wing is joined in the center is it properly glued and reinforced?
- Are all of the control surfaces (i.e. rudder, ailerons, elevator) hinged appropriately – gaps and strength?

Alignment

- Is the wing centered on the fuselage?
- Is the horizontal stabilizer centered on the fuselage?
- Is the wing and stabilizer parallel with each other when viewed head on?
- Is the vertical fin at 90 degrees to the horizontal stabilizer?
- Is the main wing at 90 degrees to the center line of the fuselage?
- Is the **dry** center of gravity at the location where the plans call for?
- If not sure a good starting point would by 25 percent of the wing cord.

Aircraft Operational Inspection

Prior to turning on your transmitter and performing an Operational test you must Pin out on the Frequency board.

Control Surfaces

- Are all of the control surfaces (i.e. rudder, ailerons, elevator, nose wheel) and throttle moving in the correct directions?
- Are all of the control surfaces (i.e. rudder, ailerons, elevator) adjusted for the appropriate neutral positions?
- Do all of the control surfaces (i.e. rudder, ailerons, elevator) and throttle move freely?
- Are all of the control surfaces (i.e. rudder, ailerons, elevator, nose wheel) and throttle adjusted for the correct amount of movement/throw?

Range Test

- A range test is required to be sure that your transmitter and receiver are functioning properly (Make sure your batteries are all charged up!).

Engine Test

- Start engine and set the needle valve for a slightly rich setting (i.e. new engines should be run slightly rich to prevent excessive engine wear/damage). Refer to your engine manual for more details.

- Check the engine for excessive vibration.
- It is good practice to perform a second range check with the engine running to ensure there are no major changes.

Students Log Book

The student should start a flight log. Using this, you can log the dates, number of flights, condition of the aircraft and any repairs to make, but most importantly, offer the Wings Instructor a place to write some comments and to certify the level you have achieved as you progress in your training. Through the course of your training you may have the occasion to team up with another Wings Instructor. This is where your up to date Log Book will greatly assist this Instructor in continuing on the same course as your regular Instructor. At the end of this manual Log Sheets can be found for your use.

Basic Theory Of Flight

The Theory of Flight will not be expounded on to any level in this manual. An excellent article can be down loaded off of the SRCFA Club Web Site. However the operation of the control surfaces on your model is of great importance when learning how to fly. Your model will probably have the following control functions:

- Throttle
- Elevator

- Rudder
- Ailerons.

The throttle controls engine rpm and as such controls the thrust to propel the aircraft forward. The elevator controls pitch, it, along with the engine thrust, increases or decrease the altitude of the aircraft; it also controls speed, and while in the air down elevator will increase speed, while up elevator will decrease speed. Rudder controls yaw which in essences is right and left turn. On a trainer aircraft the gear arrangement is usually tricycle and the rudder stick is utilized to control the craft on the ground. The ailerons control roll and along with the rudder change the direction of flight of the aircraft. In the trainer category of aircraft the ailerons generally are used exclusively to turn the aircraft, however during takeoffs and landings especially in a cross wind situation the rudder is used to hold the aircraft on course. One can read volumes on how to fly a R/C aircraft however there is no substitution for the real thing. When handling the controls on your transmitter while flying it is recommended that you make smooth small moves and allow the sticks to center after your correction. If the resultant action is not enough move the control again allowing it to center after your correction. If a control is held off center for a long period of time the aircraft will be put into some difficult positions and the Wings Instructor will be faced with the challenge of getting it back flying straight and level. Remember when you are flying, for every action taken you will have to make an equal and opposite corrective action to cancel out your initial action. For instance, when you initiate a turn using the ailerons,

once the turn is completed you will have to apply opposite aileron to level the wings. Also when learning to fly it is advisable to use a neck strap or tray to support the transmitter, this will allow you to grasp the sticks between your thumb and index finger thus gaining better control.

Typical Training Flight

Typically a training flight is usually performed in the following sequence:

- Ensure your flight pack has been freshly charged or test it with an expanded voltmeter to ensure your batteries contain enough capacity for the next flight.
- Fuel the model and prepare for flight.
- Retrieve transmitter from impound, place the pin on frequency board, observing frequency spacing.
- Turn the transmitter on first and then turn on the aircraft receiver.
- Complete a radio range test.
- Set up the Buddy Box to emulate the transmitter.
- Ensure all control surface inputs are correct both on the transmitter and the buddy box
- Open the throttle wide and then prime the engine.
- Close throttle; set the throttle trim to the starting position
- With the model restrained, install the glow driver, start engine using chicken stick or electric starter.
- With the model restrained, run engine up to full throttle, check carburetor setting, adjust as required.

- Taxi aircraft to edge of runway and announce your intentions (i.e. On the field).
- Taxi to takeoff position; announce intentions (i.e. Taking Off) taking off into the wind, observing active runway arrow.
- After take off, make the first turn away from the pits.
- Complete your manoeuvres observing model airports rules.
- Set up for landing, and announce intentions (i.e. Landing).
- Land the aircraft, taxi off of the active runway; advise other fliers that the "runway is clear".
- Taxi back to the engine shut down area. Note that you should not taxi right into the pit area.
- Turn off the receiver and then turn off the transmitter.
- Place transmitter back into the impound.
- Remove frequency pin from the board and clip to the transmitter antenna.
- Check model for any deficiencies, prepare for the next flight.

SRCFA Interpretation of Flight Steps

In order to remove any ambiguity, the following section will describe the SRCFA interpretation of the major steps leading up to getting your Solo or Wings Certification. Items such as the MAAC Safety Rules and the SRCFA Club Rules must be understood and followed. Items such as radio range checks, maneuvers and items required for Solo or Wings certification will be explained in the following sections.

Radio Range Tests

There are two types of Radio Equipment Range checks, the first one, Primary Range Check, is the mandatory range test for new equipment, new model with new or old equipment, or equipment which has been in a crash. The second one, Secondary Range Check, is the mandatory range check on radio equipment prior to the first flight of the day. In all cases the tests are done with the transmitter antenna collapsed to its lowest level. Do **NOT** operate the transmitter with the antenna removed as this puts an undue load on the Radio Frequency (RF) output transistors.

Primary Range Check

The following describes the procedure to perform a primary range check:

1. Obtain the assistance of another modeller and ask that person to verify the control surface movements.
2. Pin out following the SRCFA pin out procedure.
3. Turn on your transmitter and then the receiver.
4. With your transmitter antenna collapsed go for a walk counting the paces until the predetermined control surface no longer responds to the movement of the transmitter stick. Note the number of paces. This distance should equal or exceed what your equipment manufacturer specifies. Now slowly walk towards the model, continue to operate the same control surface and mark the spot

where you regain control. This second distance is the lock up distance or hysterisis of your system.

5. Now restrain the model, do not have your helper hold the model, as they will act as an antenna and improve the range of the system.
6. Start the engine and advance the throttle to maximum rpm.
7. Repeat the above tests, if the first distance is less with the engine running versus the engine shut down determine the reason why and repair. If there is no change in the distances chances are your equipment is in good shape.

Secondary Range Check

This is a Mandatory Pre Flight Range Test before each Flying Session.

1. Pin out following the SRCFA pin out procedure.
2. Turn on the transmitter then the receiver.
3. With the transmitter antenna collapsed go for a walk until the control surfaces start to flutter. Note the number of paces, this distance should be the same as your initial pre flight test, if you find that the distance has decreased appreciably, determine the reason why, and repair.

Setting The Buddy Box To Emulate The Transmitter

The SRCFA has a number of Buddy Boxes (Slaves.) available for use. By the student using the buddy box and the instructor using the students

transmitter the instructor can give or take away control from the student in order to save the aircraft from crashing.

When you get to the field first retrieve the box that is compatible with your unit. If you are using JR make sure that the 9 volt battery is connected. In actual fact if you are a JR user it is recommended that you have a 9 V in your flight box. That way you will always be prepared. If you install the spare battery, purchase a new one so that there is always a fully charged spare. If you are using Hitec make sure that the pug end on the cord marked Trainer/Student is plugged into the Slave (Buddy Box). When using a Buddy Box you must verify that the reversing switches and the trim tabs are in the proper position before any flying takes place.

Setting the Reversing Switches and Trim Tabs

- Pin out on the Frequency Board.
- Connect the Master (Transmitter) to the Slave (Buddy Box) using the appropriate cord.
- Turn on the Master; do not turn on the Slave (Buddy Box).
- Turn on the model receiver.
- Verify that the control functions are moving the correct direction using the Master.
- Move or depress the Trainer switch on the master, hold in this position.
- Verify that the control functions are moving in the correct direction using the Slave.

If any of the control functions are reversed, move the reversing switch on the Slave to correct. Assuming that the trim tabs on the Master are correct for straight and level flight, cycle the trainer switch on the Master and adjust the Trim tabs on the Slave until the control functions do not move while the switch is being cycled.

The Slave (Buddy Box) is now adjusted to emulate the Transmitter.

Fueling The Model

When fueling the model it is a good idea to have a catch container or a return line back to your fuel jug to collect the overflow fuel. This way the fuelling stations are kept clean and you also reduce the waste. Note that glow engines burn a fuel mixture containing methanol, nitro methane and lubricants (castor oil and/or synthetic lubricants). For beginners it is recommended that you choose a fuel which has castor oil as a portion of the lubricant. The most common nitromethane content in fuel is 5% or 10%. Note that both methanol and nitro methane are **flammable** and care must be taken when using this product.

Announcing Your Intentions

All manoeuvres that could affect the other pilots and their models must be announced. Typical intentions to be announced are**:**

- "Entering the Runway" or "On the Field"
- "Taking Off"

- "Low Level Pass" or "Low Pass"
- "Touch and Go"
- "Landing"
- "Dead Stick"
- "Field is Clear" or "Off the Field"

Before starting any manoeuvre ensure that the other pilots on the flight line acknowledge your intended actions.

Basic Manoeuvres

The SRCFA have included in their Wings Program a series of mandatory manoeuvres. In order to obtain your Solo or your Wings Certification you must prove to an Independent Instructor that you can handle your aircraft with reasonable control while completing these mandatory manoeuvres. You will also have to prove that you understand all the SRCFA Rules and the MAAC Rules. All manoeuvres must be completed on the far side of the center line of the active runway.

Taxi and Take Off

Taxi to the take off position; position the aircraft for takeoff observing the prevailing wind direction. During the take off roll, maintain control on the ground so that the aircraft negotiates the runway in a straight manner parallel to the center line of the runway, lift off with a reasonably long climb ratio, complete the manoeuvre with a 90-degree turn away from the pit or spectator area.

Right and Left Hand Rectangular Traffic Patterns

These patterns are as the name implies the direction in which all of the aircraft will fly while in the air. The traffic pattern is dictated by the take off direction on the active runway. On the SRCFA runways if you take off towards the north your first turn will be to the left, hence a left hand traffic pattern, if you take off to the south your first turn will be right, hence a right hand traffic pattern. The traffic pattern is a series of 90-degree turns, while maintaining altitude. The upwind and downwind legs are to be parallel with the active runway; the downwind leg must not be any closer to the pilot stations than the center line of the runway. The crosswind legs should be completed before the thresholds on each end of the active runway.

Horizontal Figure Eight

The Horizontal Figure Eight is formed by two circles, and is done while parallel with the center line of the runway and maintaining a constant altitude. Enter the manoeuvre with the wind, if the wind is from the left hand side, form the right hand loop first, the diameter should be from 75 to 150 feet. When forming the circle make sure that your first turn is away from the pits or the spectator area. The cross over point should be directly in front of the pilot and 150 feet from the center line. Then start to form the left hand loop, it should be the same size as your previous right hand loop, cross over at the center and finish the right hand loop, complete the manoeuvre by exiting straight and level on the same course as the entry.

Procedure Turn

The Procedure Turn is used to change the direction of an airborne aircraft which is going right to left down the center line of the runway to left to right down the center line of the same runway or vice versus. To execute this manoeuvre, enter it into the wind, down the center line, and straight and level. Execute a right or left hand turn away from the pit or spectator area, and start forming a circle in the opposite direction approximately 75 to 150 feet in diameter, when the aircraft is pointing in the opposite direction down the center line of the runway adjust for straight and level flight. The turns should be executed beyond the thresholds of each end of the active runway.

Circle Around a Point.

This manoeuvre will require that it be done in both the left hand and right hand configurations while maintaining constant elevation. Place the center of the circle in front of the pilot, and 75 to 150 feet from the flight line. The circle diameter should be 75 to 150 feet. To complete the manoeuvre exit on the same course as you entered.

Stall and Stall Recovery

This manoeuvre is entered into the wind, straight, and level and at a safe altitude, 200 to 300 feet. At the start of the manoeuvre reduce the throttle to idle and continue to add elevator until the aircraft stalls. The nose of the

aircraft dropping or a wing tip dropping indicates a stall. When this happens allow the elevator to go to neutral, level the wing if required, apply power and climb to a safe altitude to complete the manoeuvre. Incidentally this manoeuvre can be used to determine the landing characteristics of a new model.

Slow Flight

This manoeuvre is entered into the wind straight and level at a safe altitude. Reduce throttle and maintain altitude while continuing to advance forward maintaining level flight. Depending on the wind it is possible to arrest all forward flight and hover the aircraft. To do this will require constant adjustments to the throttle, ailerons, and elevator. To complete the manoeuvre, advance the throttle and climb to a safe altitude. This manoeuvre can also be used to determine the landing characteristics of a new model and get you accustom to the feel of your aircraft at slower speeds.

Glide

This manoeuvre is entered into the wind and is similar to Slow Flight with the exception that you let the aircraft glide to a lower altitude. Reduce the throttle to idle when the model has attained a predetermined lower elevation, throttle up and climb to a safe altitude to complete the manoeuvre. This manoeuvre emulates what will happen when the engine quits and the model needs to land without power.

Three Touch and Goes

The Touch and Go is similar to a landing except that when the mains hit the ground the aircraft is throttled back up and the model is taken to a safe altitude. This is done three times in succession. It is not a difficult manoeuvre but it is intimidating.

Landing and Taxiing back to the Engine Shutdown Area

This manoeuvre is usually entered from a Horizontal traffic pattern, and always entered into the wind. The downwind leg elevation should be adjusted so that the glide slope of the aircraft and subsequent flair will touch the model down directly in front of the pilot, and on the far side of the center line of the runway. A successful landing will place the model on the runway with the engine running, the pilot then taxies the model to the engine shutdown location, thus completing the manoeuvre.

Simulated Dead Stick

This manoeuvre is usually entered from a Horizontal traffic pattern, and at a safe altitude. The instructor will ask you to bring the engine to idle and simulate a dead stick landing. The student will then bring the engine to idle and immediately direct the aircraft toward the landing strip while maintaining an appropriate air speed and reducing elevation. The aim is to get the aircraft into a position where you are entering final approach for landing and in good position to make a landing if required. You need not land the aircraft.

Solo Status And Your Wings

Each of the preceding items can be classified as steps to obtaining your Solo and ultimately your Wings Certification. There are essentially two stages to becoming a competent R/C pilot:

1. The first is to obtain your Solo Card. When you have proven to your instructor that you can safely handle an R/C trainer aircraft on the ground and in the air, the instructor will ask you to solo. This is your first flight without the aid of an instructor. During this flight you will be asked to take off, perform some very basic manoeuvres, and then land and taxi into the engine shutdown area. If the Instructor judges you to have passed, then you will receive your Solo card. This card enables you to fly with out the aid of an instructor so you can continue to practice the items for your wings test. Once you can perform the items on the wings test consistently, you can request an instructor to administer the wings test.

2. Once you have received you Solo Card and have mastered the items on your wings test, you should request a wings test. An instructor will ask that you perform the required manoeuvres within two flights. If you complete the test and are judged adequate by the instructor, you will have passed the wings test and will have earned your R/C wings. You will then be presented with your Wing's Pin and your achievements will also be announced at the next Club meeting. In addition your name will be entered on a Club Scroll.

Wings Flight Requirements

To ensure the safety of all club members, new pilots must qualify before solo flight. Minimum proficiency in the following requirements must be demonstrated to a club instructor who will then initial the requirement. When all requirements have been initialled, a final series of check flights must be successfully completed and signed off by an instructor. The new pilot will then be presented with his Wings' pin.

The following outlines the requirements for this flight test:

1. Taxi and ground handling - show ability to control aircraft on the ground. Include safe operating procedures and adherence to club rules.
2. Take-Off - announce intention.
3. Procedure Turn - 90 degree turns, straight and level flight, left and right turns. Traffic pattern familiarization (maintain enough altitude for safe recovery).
4. Circle around a point - climb to altitude and maintain while circling, both left and right.
5. Figure eight - maintain altitude, center crossover point at same place.
6. Slow flight - minimum power setting, maintain altitude.
7. Stall and stall recovery - climb to safe altitude, stall aircraft, resume straight and level flight.

8. Gliding - climb to altitude, reduce power to idle, and glide to safe height. Resume normal flight.
9. Demonstrate a simulated (throttle at idle) dead stick landing to a runway.
10. Traffic pattern - fly both left and right patterns.
11. Three Touch & Go's in a single flight - announcing intentions each time.
12. Landing - announce intention, landing under power and taxi back to Pilot station.
13. Check flights, demonstrating 1-12 above in no more than 2 flights.

What if You Crash?

For many beginners, this is a very difficult situation, particularly since their dreams have been of flying the aircraft, not of seeing their pride and joy as a mangled wreck. Certainly it is an unhappy situation no matter what. The sight of the crashed model is very often a shock to the beginner with much in common with seeing a member of the family in obvious poor health. This section is devoted to explaining that the end of the world is not at hand. The following items will prepare you for these events:

a. Don't panic. In the fragile world of model aircraft, it is inevitable that one portion of the complex number of things involved will sooner or later fail. This is not to be blasé' about the situation, but to be realistic about what may happen. The best defence against this curse

is to commence building a back-up aircraft as soon as you have finished the first. A second aircraft will ensure that you can continue your flight program and will often build much more quickly than your first since you have learned a lot in the process of creating the original. You may wish to consider buying a used, pre-built or Almost Ready to Fly (ARF) aircraft to continue since these have a good track record and can be procured quickly;

b. Don't attach blame. This will do no good and create additional frustrations for you. These unfortunate events happen to everyone and will happen again to you. Everyone will have done their best to avoid this situation and after the fact, post mortem should only be conducted to ensure that the cause of the crash has been accurately determined to try to avoid having it happen again;

c. Pick up all of the pieces. You may not believe it, but you can repair an aircraft very quickly to flyable shape. CA or crazy type glues will reconstruct damage in a way that will surprise you and the aircraft will be stronger after the repair than before. Less difficult than putting together a jigsaw puzzle - really! Engines must be carefully cleaned and inspected before being used again and radios must be carefully range checked to ensure that they are functioning correctly. If major damage to either has occurred, you may wish to consider sending them back to the manufacturer who can repair them properly in short order and at a reasonable cost. Most importantly, you will

have some additional assurance that the job has been done correctly; and

d. Do not go into the closet. Your confidence will be shaken and you will be frustrated and upset. Everyone has crashes and other members can help you to get back into the air. Quietly putting the parts into the garbage and disappearing into the sunset is likely to see you gone from our ranks forever and this would be most regrettable.

In Case Of An Accident

We hope that this never occurs, but it is useful to know just what to do about it. Should your model cause damage such that there may be claim against your MAAC insurance it is extremely important that the event be communicated to the SRCFA executive and the MAAC zone director as soon as possible. Members of the Association executive or the zone director will have the claim forms that must be filled in for making a claim against your MAAC insurance.

Conclusion

We sincerely hope that you will find this hobby rewarding and fulfilling. Our instructors are the best around and SRCFA is proud of the record of these individuals. Good luck in your flight training and once again welcome to the fascinating world of radio control.

Adapted from Model Aeronautics Association of Canada Wings Program "Advise to the Student" and R.C.M. Flight Training Manual Vol. 11

Good Luck in your Endeavours and Thanks for Joining the SRCFA

The SRCFA Executive

Section 4

MAAC Safety Code

The current MAAC Safety Code is available on the MAAC web site located at www.maac.ca This code is in affect at all SRCFA flying sites. Note it is your responsibility to review these codes and abide by them while using SRCFA facilities. Failure to follow the MAAC safety code could void your MAAC insurance. For the latest and most complete edition of this code please refer to the MAAC website.

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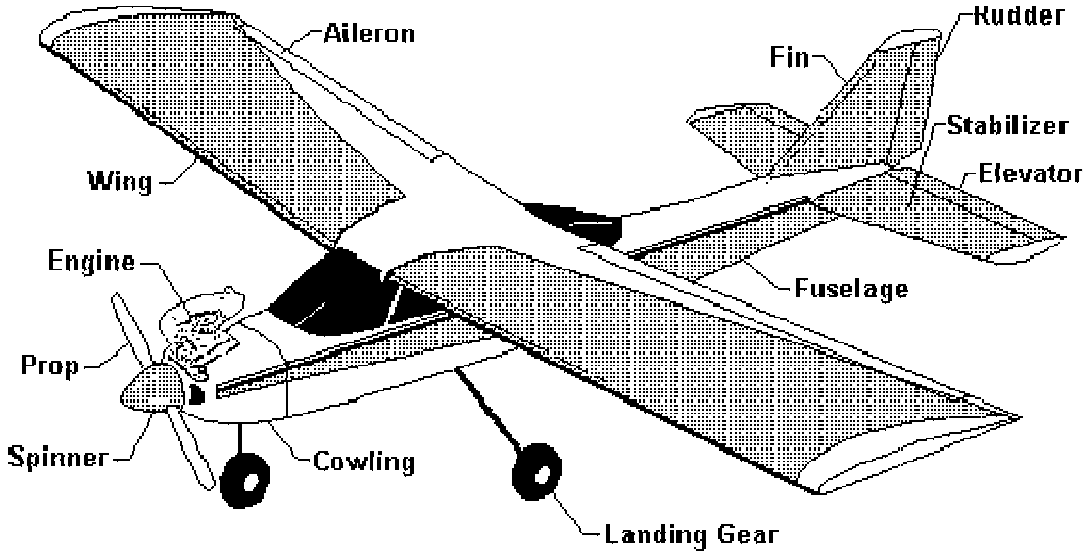
5 Appendix – General Information

The Basic Trainer Aircraft

Quite often a person has an interest in model airplanes and visits a local flying field just to observe. He sees all types of airplanes from trainers to pattern planes to scale World War II fighter planes. His interest is piqued by all the fabulous looking models. He thinks, "I have to have one of those Mustangs." He immediately sets out trying to find a P-51 model to begin his modeling hobby**.** **This is a serious mistake**. Many hours of training and practice are involved before a beginner has the ability to handle the more advanced models. A beginner ***must*** realize the dedication that is required to gain the ability to fly the type of model that initially spawned his interest. He must begin the hobby with a basic trainer and progress through different levels of models until his goal is reached.

A trainer is a specific type of model aircraft that is designed to be stable in flight. This means that it has an inherent ability to correct itself and overcome the rotational forces applied so that it regains straight and level flight. Most trainers are designed so that they remain stable in slow flight so that they are easy to land.



Basic Trainer

The Basic Trainer diagram shows the components of a common trainer.

Aileron	The moveable portion of the wing which causes a change about the roll axis
Cowling	The part of the fuselage which covers the engine
Engine	A 2 - cycle reciprocating machine which provides the motivational power
Elevator	The moveable portion of the horizontal stabilizer which causes a change about the pitch axis
Fin	Properly known as vertical stabilizer which provides stabilization about the yaw axis
Fuselage	The main body of an aircraft
Landing Gear	The supporting structure of an aircraft including landing gear struts and wheels
Propeller (Prop)	The combination of blades which provide thrust
Rudder	The moveable portion of the vertical stabilizer which causes change about the yaw axis
Spinner	Covering over the prop hub
Stabilizer	Properly known as horizontal stabilizer which provides stabilization about the pitch axis
Wing	The horizontal surfaces which provide the lifting forces

There are certain criteria that a trainer should have in order to be satisfactory for a beginner.

1. **High Wing** - A high wing model is inherently more stable than a low wing model due to pendulum effect. Since the weight of the model is below the wing, the fuselage tends to swing downward like a pendulum in order to equalize forces.
2. **Flat Bottom Wing** - The wing cross section should have a virtually flat bottom. This type of cross section has more gentle flight characteristics that are necessary for a beginner.
3. **Dihedral** - The wing should have some dihedral. This means that the tips of the wings are higher than the center. The effect of the dihedral is to try to equalize forces and keep the wings level or to return the wings to a level orientation.
4. **High Aspect Ratio** - The ratio of the wing length or span should be at least 5 1/2 times the width or chord. This will reduce the rate at which the model responds to command input allowing more time for a beginner to react.
5. **Constant Chord** - The width of the wing should be the same from the center or root to the end or tip. This distributes the weight of the airplane evenly over the entire surface of the wing.
6. **Low Wing Loading** - The weight of the model divided by the area of the wing should not exceed 19 oz./sq. ft. This reduces the speed required to maintain an acceptable rate that the model descends when the power is reduced resulting in a lower landing speed.

7. **Moderate Size** - Most trainers are for engine sizes between 40 and 60. The smaller ones are more susceptible to the effects of wind and normally the wing loading is higher simply because of the weight of the radio equipment. The larger sizes are easier to fly and easier to see but are more difficult to transport. Most trainers are for 40 size engines. These trainers have been widely accepted as the optimum size.
8. **Structurally Sound** - A trainer must be able to take the abuses imposed by a beginner. This is especially true for hard landings. It must be able to withstand minor crashes with minimal damage. It should be relatively easy to repair.

A trainer that meets these guidelines will give the beginner excellent service without the frustration that can occur with an inappropriate model. With proper instruction, the beginner can progress quickly to his solo flight and on to the novice stage and still get years of sport flying from the trainer.

There are several trainers on the market that meet and far exceed the guidelines. These range from the most basic kit to beautiful Almost Ready to Fly (ARF) models complete with engine and radio. There are a lot of considerations when choosing a trainer but the two most basic are time and money.

A trainer built from a kit has the advantage of being less expensive in some cases. It gives the builder the pleasure of building, the option of color and trim scheme, and the knowledge of the structure to perform repairs. The biggest disadvantage is the time required to construct the model when the beginner would rather be learning to fly. Another disadvantage in some cases is the emotional attachment the builder develops having spent many hours on his creation.

The big advantage of the ARF models is that they can be assembled in a matter of a few hours and the beginner can be ready to start his flying lessons. The disadvantages are the cost, the unknown structure that is sometimes weak, and the fixed color scheme. Most ARF models perform as well or almost as well as any kit built model on the market. Any beginner who purchases an ARF model should get an experienced modeller to check the model before assembly is started. An experienced modeller can point out areas that may need to be reglued or reinforced.

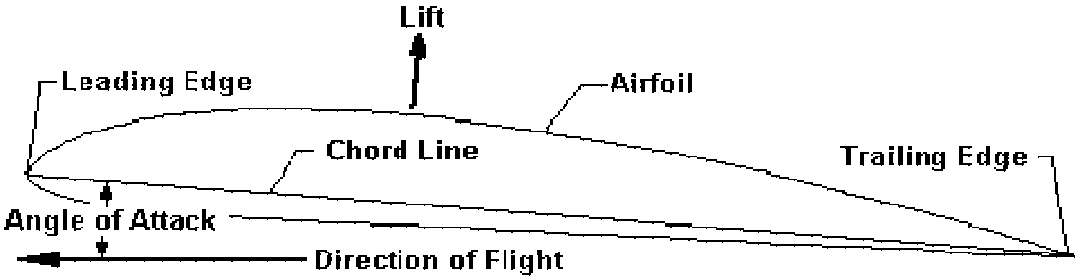
There are several models that are widely accepted as being the best in the field although there is disagreement as to which is the "All Time Best". Some of the trainers are also available in .20 and .60 size but the .40 is the most widely accepted.

Taken from:

Beginner's Guide to R/C Flight

The Basics of Flight

The basic concepts of flight should be understood by a beginner flyer. The theories behind the physics of flight are covered in many volumes of books. There are different and sometimes conflicting theories and arguments as to how airplanes fly, but the one accepted principle is that lift is generated as a result of the air pressure on the bottom of the wing being higher than the air pressure on the top of the wing.

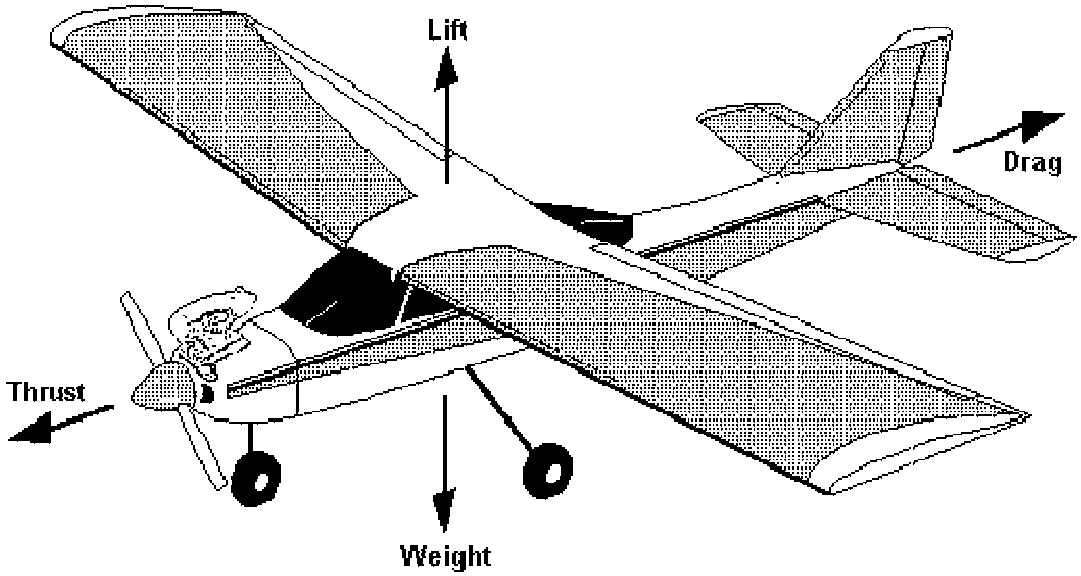


Lift Diagram

The Lift Diagram shows some of the basic terms relating to a wing section. These terms are common to R/C flight.

Airfoil	The cross section of the wing
Angle of Attack	The angle between the chord line and the relative direction of flight
Chord Line	The line between the leading edge and the trailing edge of the airfoil
Direction of Flight	The relative direction of the wing in relation to still air
Leading Edge	The most forward edge of the wing
Trailing Edge	The most rearward edge of the wing

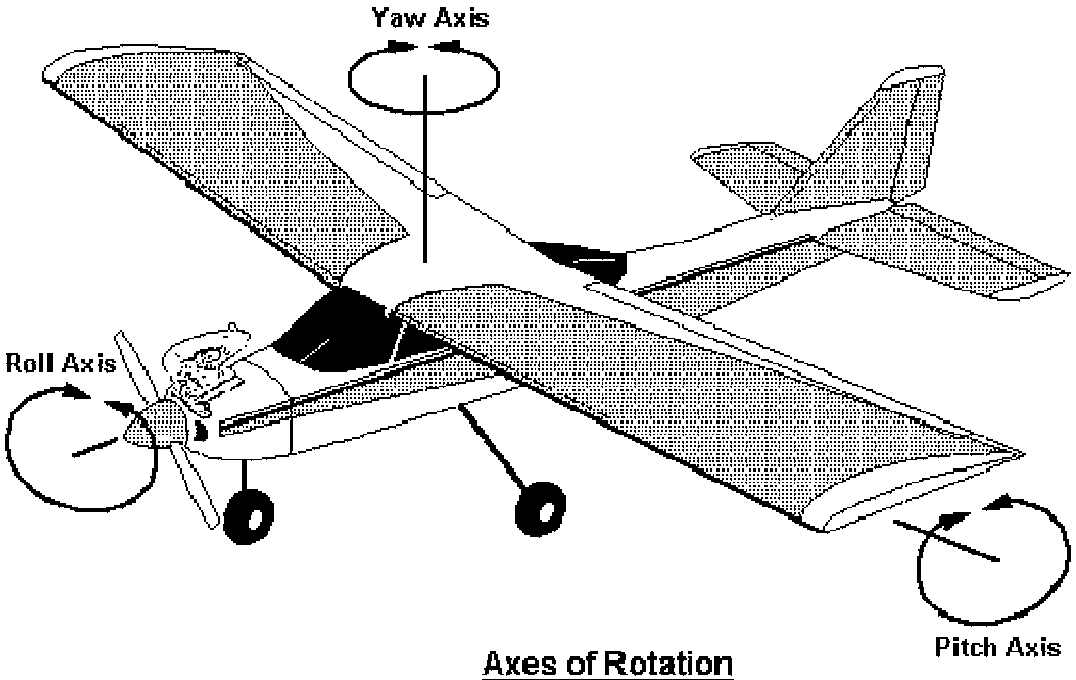
There are four (4) primary forces which act on an aircraft in flight; thrust, lift, drag, and weight. Thrust is the force applied by the combination of engine and propeller acting to pull the aircraft forward. Drag is the resistance against the aircraft by the force of the air against the forward facing surfaces. Weight is caused by gravity. In order for a constant speed to be maintained, thrust and drag must be equal. In order for a constant altitude to be maintained, lift and weight must be equal.



Flight Forces

Lift increases as the velocity of the air passing over the wing increases or as the angle of attack increases as long as the flow of air over the wing remains smooth. Actual flight is attained when the force of the lift equals weight.

An aircraft pivots about three (3) axes; the yaw or vertical axis controlled by the rudder, the pitch or lateral axis controlled by the elevator, and the roll or longitudinal axis controlled by the ailerons. It can pivot about any one of these individually or in combination based on the control surfaces that are moved and the direction of the movement.



Axes of Rotation

When the rudder is moved to the right, the aircraft will rotate to the right about the yaw axis and vice versa. When the elevator is moved up, the aircraft will pitch the nose upwards. The ailerons move in opposite directions. When the left aileron is moved up and right one down, the aircraft will rotate to the left and vice versa.

Taken from:

Beginner's Guide to R/C Flight

The Basic Radio System

There are many modern radio systems from which the beginner can choose. There are several common brands including Futaba, Airtronics, JR, and Hitec. Each of these offers a wide range of options from a simple 2 - channel to a computer assisted 9 or 10 - channel system. The buyer is limited only by his budget. A beginner should discuss his choice of systems with his intended instructor. There are several reasons for doing this, the primary reason being that the student's systems must be compatible with the instructor's system if it will be used as a buddy box. This issue will be covered in more detail later.

All basic radio systems consist of four (4) basic components.

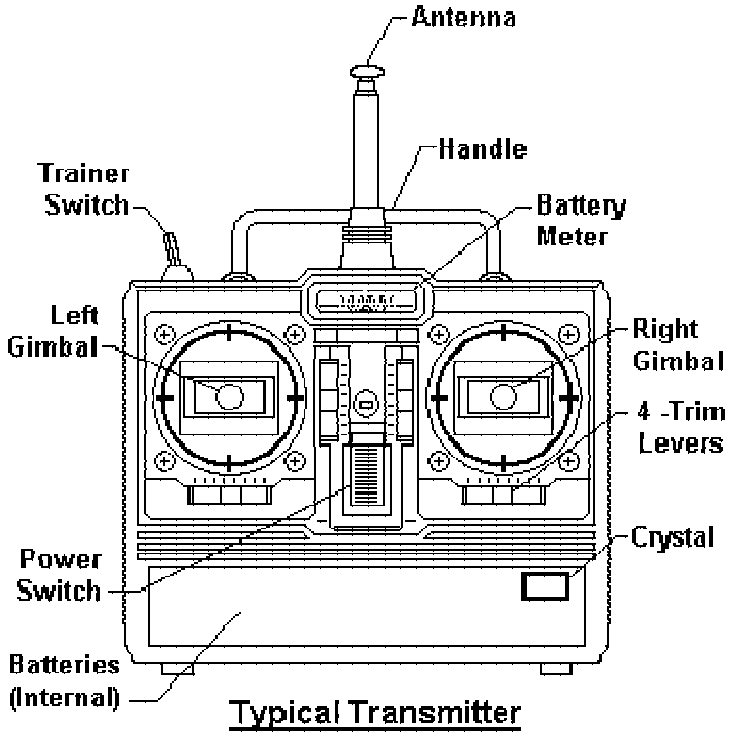
Transmitter	The unit which takes the input from the user through the gimbals or sticks, encodes it, and sends it to the aircraft
Receiver	The unit that receives the signal, decodes it, and routes it to the appropriate servo
Servos	The device that converts the decoded signal to mechanical force to operate a control surface
Batteries	The device that provides power for the other devices to operate

There are specific frequencies assigned by the Federal Communications Commission (FCC) for use with airborne R/C models. A beginner must ensure that the system that he chooses is tuned to one of these frequencies. Most radio system manufacturers place a sticker on the outside of the carton that says, "For airborne use only". There is a frequency reference chart available that lists the purposes of all of the frequencies that are assigned for R/C use. The radio that

is chosen must meet the 1991 specifications for narrow band receivers. The actual requirements of these specifications need not be known by the beginner because the systems are required to be certified to this standard. The owner's manual for the system will note that the requirements are met and many of the transmitters and receivers will have a gold sticker to signify this fact.

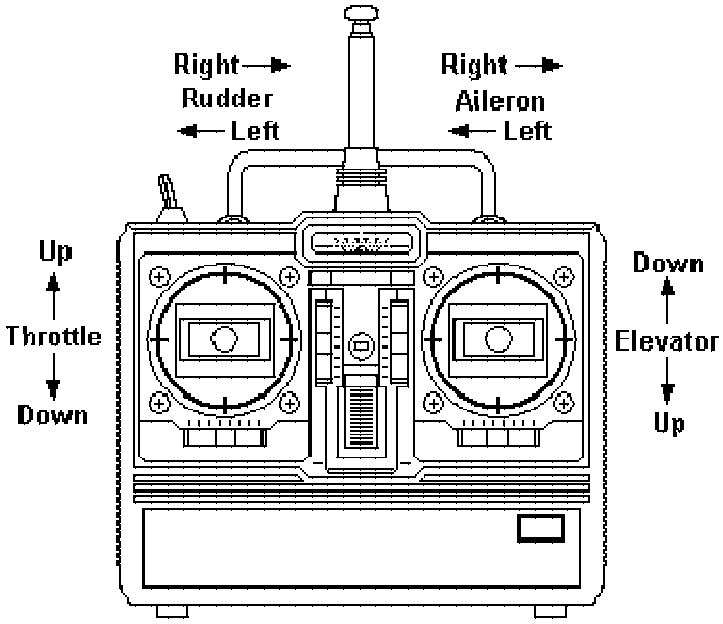
The radio system typically will transmit and receive on an FM frequency. The FM frequencies are less prone to interference than the AM frequencies. Some radio systems use one of two types of internal systems to help to nullify interference. These are called PPM and PCM. Each has its advantage but they are only available in more expensive radio systems and should not concern the beginner.

Regardless of the brand of system, the number of channels, or the price, all transmitters have the same basic components. Transmitters may have additional switches, slides, and displays depending on the functions they perform but the basic components remain the same.



Typical Transmitter

Antenna	The telescoping tube that transmits the signal
Batteries	The device that provides power to the transmitter
Battery Meter	The device used to monitor the strength of the transmitter batteries
Crystal	The device that sets the radio frequency of the transmission
Gimbal (or Stick)	The device that allows the user to input desired control movements into the transmitter
Handle	The device for carrying the transmitter
Power Switch	The switch used to apply battery power to the internal components of the transmitter
Trainer Switch	The switch used to allow an instructor to give control of a model to the student
Trim Lever	Slides used to adjust control surfaces during flight



Mode II

Mode II transmitter set up has grown in popularity and is used almost exclusively in the USA. A beginner does not have to be concerned about which mode he should select since most manufacturers install the gimbals according the most widely used mode for the nation to which the radio system is being shipped.

A beginner might consider buying one of the more advanced six (6) channel systems to get some of the features that are not available in the basic system such as dual rate controls. This feature allows the user to reduce the sensitivity of the sticks thereby reducing the chance of over controlling. If the beginner is relatively sure of future goals that involve the use of a six (6) channel system, he can consider this an investment in his future modeling and therefore save money. A lot must be determined before the initial purchase and should be discussed at

length with experienced modellers, especially the intended instructor, before the purchase is made.

Taken from:

Beginner's Guide to R/C Flight

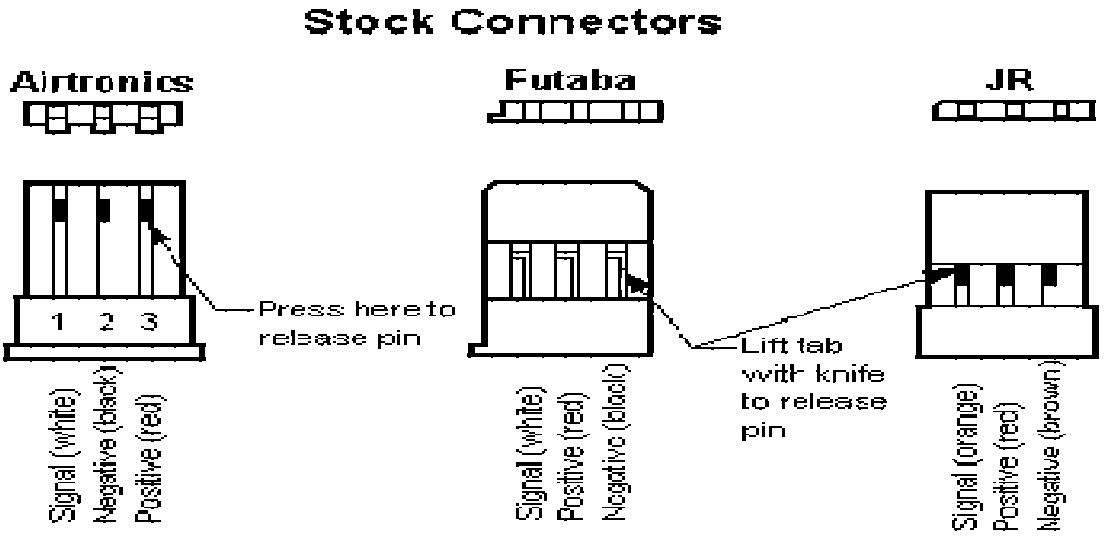
Computerized Radios

Please note if you are using a computerized radio do not set any of the control surface volume controls (i.e. ATVs) or end points using the programs available in the transmitter. Do all of the set-ups such as neutral positions, and control throws by adjusting the mechanical linkages. If the neutral positions, control throws, or end points are adjusted using the computerized functions they will interfere with the setting up of the Club Buddy Boxes.

Servo Connectors For R/C Models

The following drawing shows the different servo connectors based on manufacturer. The Futaba and JR servos are interchangeable, and so are most others like Hobbico, HiTec, etc. All it needs is the connector modified a bit and the wires matched on the correct connector pin (ie. signal/positive/negative) to fit the jack on the receiver. Prior to mixing

manufacturers it is highly recommended you discuss your plan with one of the more experienced members of the club to ensure it will be acceptable.



Typical Servo Wire Color Code for US/CANADA

Radio Brand	Positive	Signal	Negative
Futaba	Red	White	Black
JR	Red	Orange	Brown
Hitec	Red	Yellow	Black
Airtronics	Red	Orange	Black

Batteries

Appropriate knowledge about batteries and the proper care of batteries are vital to the survival of your model. Since the aircraft control surface servos, receiver, and transmitter depend on well functioning batteries, it is important that you understand the basics on Nickel Cadmium (i.e. NiCad) batteries. The most common type of batteries used in model aircraft today

is the Nickel Cadmium (i.e. NiCad) rechargeable battery. Your aircraft receiver and servos will operate on either a 4.8 volt (four cells) or 6 volt (five cells) NiCad battery. Most aircraft transmitters made today operate on a 9.6 volt (eight cells) NiCad battery. It is imperative that the first charge you give your batteries is based on the instructions you received with your charger. Most aircraft transmitters come with a 4.8 V NiCad receiver battery, a 9.6 V NiCad transmitter battery, and a "slow charge" wall charger. Ensure all your batteries are fully charged just prior to coming out to the flying field. If you want to fly and have not charged your batteries within the last 48 hrs you should charge your batteries prior to coming to the field. This is because NiCad batteries will lose a small portion of their charge each day (unless the batteries are on a trickle charge). This is known as the battery's self discharge rate.

Remember when it comes to batteries:

No power = No control = No Model **(i.e. very expensive test flight)**

It is possible to purchase an instrument from your local hobby shop called an expanded voltmeter. This instrument is used to measure the battery pack voltage and indicates the status of your battery pack. It may be worth getting one of these given the consequences. You may want to get into the habit of testing your flight pack prior to each flight. This is the safest way

to ensure your battery pack is in good shape and has enough charge to last the next flight.

Here are some basic facts about NiCad batteries:

- Typical NiCad self discharge = 1 to 2% loss per day (on a good battery, poor batteries can be much higher)
- Voltage @ discharge state = 1.05 V per cell (typically 1.1 V per cell is used). See Figure 2 & 3 for the voltage change with respect to battery capacity.
- Voltage @ charged state = typically 1.35 to 1.38 V per cell. See Figure 2 and 3 for the voltage change with respect to battery capacity.

NiCad batteries will get a "memory" so it is recommended that 3 to 4 times a season you cycle (cycle is defined as charging the battery pack and then discharging the battery pack with an appropriate cycler) your battery pack with an approved cycler. If you cycle a fully charged battery you should not get less than 85% of the battery capacity. If you get less than 85% of the battery capacity, the battery pack is suspect and should be discarded.

For example if you have a 4.8 volt 600 mah Nicad receiver battery and cycle the battery getting less than 510 mah (0.85 x 600 mah = 510 mah) you should consider discarding the battery pack. In reality you may want to consider cycling the battery a few times after this to see if the results are repeatable prior to discarding the battery pack.

Note that battery memory can be loosely defined as the loss of battery capacity due to repeatedly charging a battery pack prior to the battery pack not being fully discharged.

NiCad batteries may be charged at different rates (with an appropriate charger) as per the following:

C = Battery Pack capacity in mah (milliampere hour)

Trickle Charge (Hold Charge)
Charge rate = C/50 in mah
Charge Time = Indefinite
- This charge prevents the self discharge process from occurring and maintains the pack at full capacity.

Overnight Charge (Slow Charge)
Charge rate = C/10 in mah
Charge Time = 14 to 16 hrs.

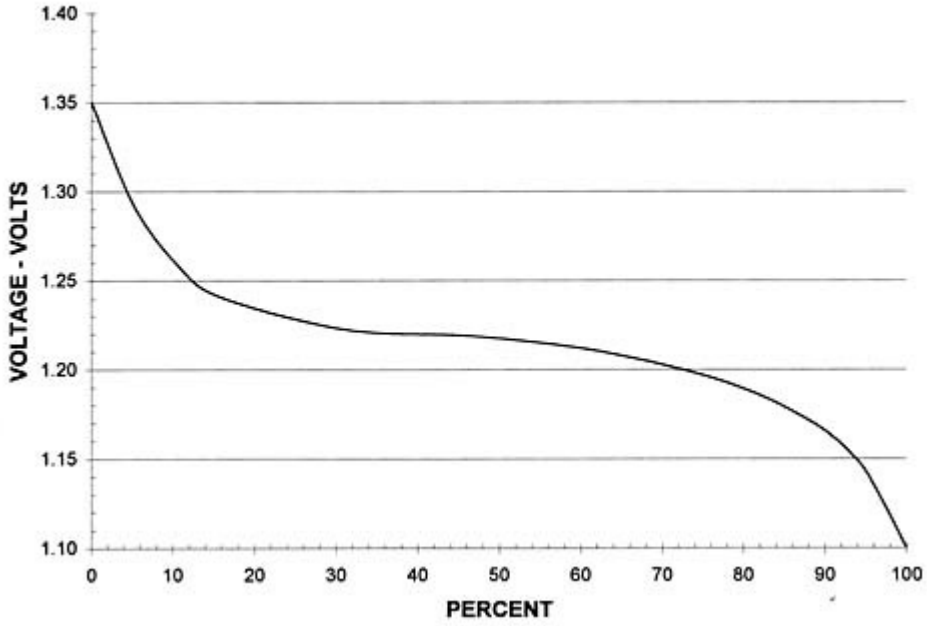
Quick Charge
Charge rate = C/3 in mah
Charge Time = 4 to 6 hrs.

Fast Charge
Charge rate = 3C in mah (Never charge over 4C or battery damage will occur!)
Charge Time = typically 15 to 20 minutes (but always under 1 hr.)

Note #1: Always slow charge a new battery pack to ensure the pack is "formed".

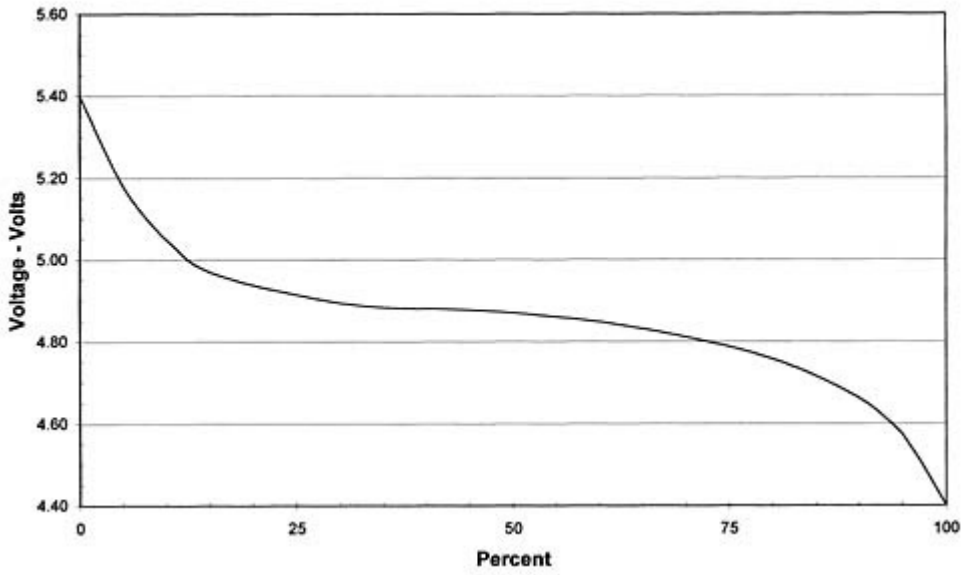
Note #2: Special chargers must be used for Quick and Fast charges so that the charging process must be auto terminated when the pack is fully charged or battery pack damage can occur relatively quickly.

FIGURE 2 - PERCENT CHARGE USED
ONE NiCd CELL



On Figure 3 I have multiplied the voltage readings seen on Figure 2 by four to show the discharge characteristic of a 4-cell battery. It applies to any 4-cell battery discharged at any constant current rate.

FIGURE 3 **PERCENT CHARGE USED, 600 mAh NiCd BATTERY**



The curves move downward slightly as load increases because of lead and battery internal resistance, but the difference is small if the constant discharge current is less than about 0.5C. This would be 300 milliamperes for a 600 mAh battery and 600 milliamperes for a 1200 mAh battery.

The general practice in R/C modeling is to operate batteries at an actual average discharge rate of less than 0.5C in order to obtain a reasonable battery life.

Background On Noise Generated From R/C Models

There is noise all around us, from the weed eater next door to the kids playing in the street, to the cars driving by. Why should we be concerned with RC model noise when much of the noise we hear daily is louder than the sound put out by our planes? The answer is that noise pollution is being considered a major issue by increasing numbers of communities across the country every day. Some noise (such as the lawn mower or the jet flying overhead) becomes a part of our everyday lives. Noise generated by "Leisure" activities is an all-together different subject, and one that many folks are very intolerant of. If your community does not currently have a noise ordinance, chances are that it will in the future, and it will be "leisure" types of noise issues that will be targeted first.

As RC pilots, our first noise challenge is to be a good neighbor and be accepted into the community. I have heard it said recently that, "I don't have to worry

about noise; my RC field is in the wide-open spaces." Well if you fly most of you're flying will be at facilities that don't enjoy the open environment free from homes or other development sensitive to noise. As an example, most of us live in the metro Edmonton area and most if not all of the clubs in the area have commercial or residential development that is impacted by the sound generated by the RC field.

Ten years ago there was only a handful of large (1/3 scale and above) planes flying, we now have a large contingent of planes from 25% on up to 44%. Unfortunately, these large birds put out much higher volumes of low frequency noise than other model types, and it is this type of noise that travels at levels easily heard for much longer distances than anyone realized. In fact we found that the sound can actually travel for over a mile (depending on atmospheric conditions) at levels equal to that of human conversation. To put it another way, at a mile, your plane has the capability to disrupt someone's outdoor conversation! We know this to be a fact because we have measured it (by decibel meter), and have had a number of folks show up at the field stating they heard our planes flying while they were at a park that is a mile away!

Noise generated from R/C aircraft typically originates from four sources:

1. Engine exhaust
2. Propeller
3. Intake reed valves on gasoline engines
4. Airframe vibration

One of the other contributors to aircraft sound output is one that has nothing to do with hardware. It is the individual pilot and what he or she does with the throttle. Many use way too much power flying the sequences. With most of our planes offering thrust to weight ratios in excess of one to one (and many approaching two to one) we all have enough power to fly the maneuvers with less than full power. Many of the top pilots in North America, only use full power on a few of the most demanding vertical compound maneuvers found in the IMAC Unlimited, Masters and TOC sequences. Most fly horizontal lines at greatly reduced power settings and only use the power required to fly the upline needed. Research has shown that the number one sound generator affecting surrounding communities is the full power upline.

Most flyers have many questions regarding the prop tip speed. Many folks want to know exactly when their propellers will become too loud. Many also feel that a prop, which is "barking" or "ripping", has blade tip speeds that exceed the speed of sound. There has always been (and will continue to be) much misunderstanding regarding prop noise. Keep in mind that the airfoils we use on propellers are not designed to go supersonic, and much blade and airframe damage could result if the propeller ever went close to, or past Mach 1. As airfoils accelerate air over the top (curved) surface, the velocity of this flow can approach supersonic speeds even though the airfoil is traveling far below the speed of sound. The speed at which the local velocity of the air flowing over an airfoil reaches Mach 1 is called the critical Mach number. Since the local velocity of the air at this "critical" airspeed has reached or exceeded Mach 1, shock waves begin to form as a means of pressure recovery returning the flow to

a subsonic velocity. When this happens, your propeller becomes very inefficient and produces quite a bit of vibration along with the excessive noise that is directly attributable to shock wave formation.

Research has shown that propeller rotational speeds, and high prop tip speeds are a major potential source of excessive noise emissions. As posted here we provide a graph that displayed our belief that rotational speeds above Mach 0.7 create large amounts of noise. In our view, Mach 0.7 is the speed at which propellers in general become excessively loud. While we cannot say with certainty that if one attempts to keep the rotational speed at or below this value, one will be assured a quiet reading, we are saying however that rotational speeds (as well as prop design) have a distinct effect on sound emissions. Therefore the lower the rotational speed the lower the noise level. **Recent testing shows that one should try to keep the tip speed at or below Mach 0.6 to obtain a really quiet setup.** The reason for this stems from the fact that most of the propellers, which are currently available, employ the use of Clark-Y or derivative airfoil section which have very low critical Mach numbers (around 0.5-0.55.)

Technical Discussion On Propellers

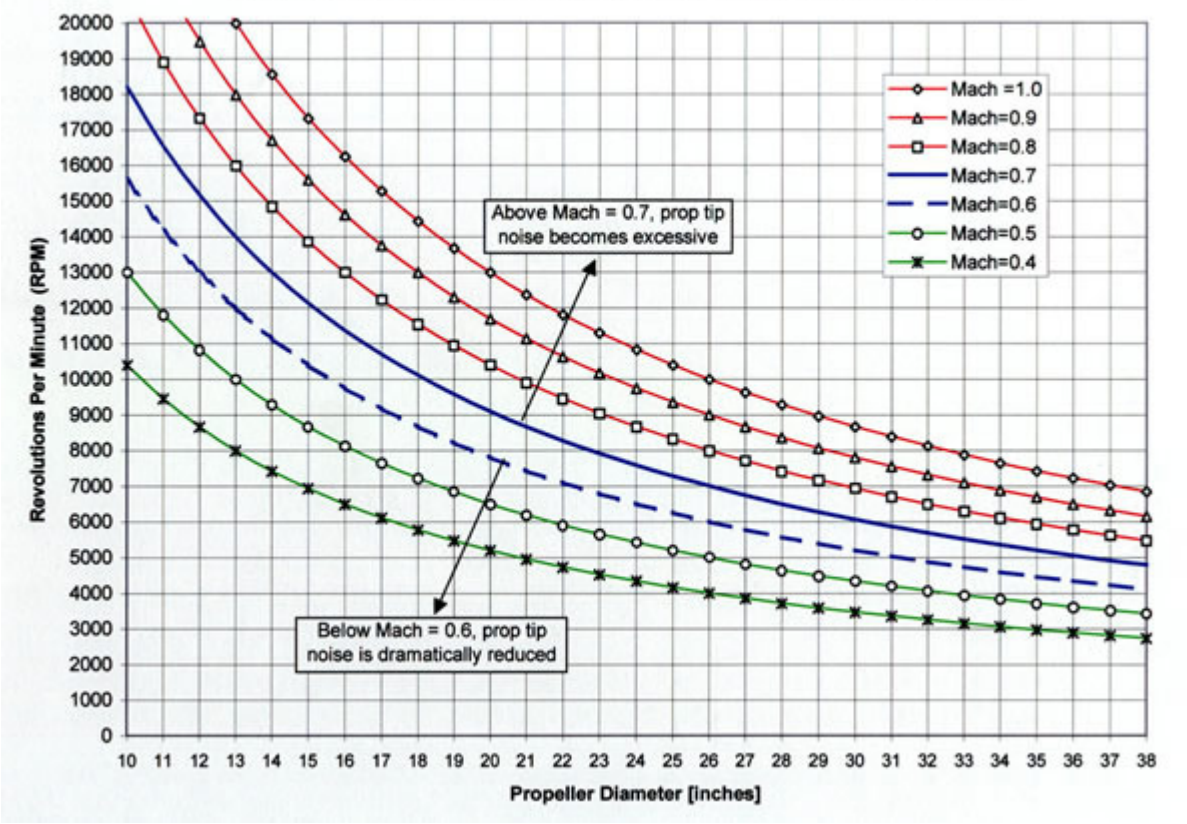
Our interest with prop noise exists as the sound pressure levels dB(A) we hear and the effect it has on others. With our planes, we are interested in human perception of the sound our planes make. Propeller rotation (as a function of RPM), which, for a given temperature and blade diameter can be easily converted to Mach number, allows us to plot the data such that we could

compare many different propellers under various ambient conditions. Most of the props that we use in employ flat-bottomed (Clark-Y type) airfoil sections of moderate fineness ratios (10-12% thickness to chord). These airfoil sections have the unfortunate opportunity to operate in both low Reynolds number and high Mach number environments where both viscosity and compressibility can dominate the flow field, just the sort of situation that makes it difficult to predict propeller aerodynamics since the interactions of compressibility and viscosity become highly non-linear. Regardless of the difficulties, these sections tended to have dB vs. Mach plots that closely resembled the non-linear compressible drag rise that's often seen in airfoil data. This drag rise is directly linked to shock wave formation. As it turned out the propeller noise increased along side the drag rise.

Most airfoil data shows the compressible drag rise (shock wave formation) to become significant between Mach 0.6-0.7 (depending on the airfoil design). This sort of relationship grows exponentially with increasing Mach number and can be modeled by the classical "Prandtl-Glauert Compressibility factor."

In other words, almost any airfoil will form shock waves between Mach 0.6-0.7 and the model propellers we use typically employ airfoils that have high critical Mach numbers around 0.55 to 0.6 because of the thick sections that are used (thickness to chord ratios > 10%). Perhaps this critical Mach number could be pushed further out with blades that are thinner (t/c < 10%) or more leading edge sweep near the tips also a transonic type airfoil section could be used but this would all need to be thoroughly tested before proclaimed to be a viable solution.

Figure 1. Propeller Tip Mach Numbers (@ 75 degree F, ambient temperature)



Section
6

SRCFA Wings Forms

The following forms have been enclosed for your use.

Flight Maneuvers You Will Learn From Your Instructor

The following maneuvers will be taught to you by our club instructors:

1) Taxi
2) Takeoff
3) Straight and Level flight
4) Turns
5) Figure Eight's
6) Turns around a Point
7) Steep Turns
8) Climbing
9) Descending
10) Slow Flight
11) Stalls
12) Spins
13) Spirals
14) Procedure Turns
15) Landing Patterns
16) Approaches
17) Landings
18) Crosswind Landings
19) Dead Stick Landings
20) Illusions Created by Drift
21) Loops
22) Rolls
23) Hammer Head Stalls
24) Immelman Turns
25) Unusual Attitudes
26) Radio Trims

1

Student's Log Book

Date	Instructor	Plane	Flight Time	Exercise Practiced and Notes

2

Student's Log Book

Date	Instructor	Plane	Flight Time	Exercise Practiced and Notes

3

Student's Log Book

Date	Instructor	Plane	Flight Time	Exercise Practiced and Notes

4

Student's Log Book

Date	Instructor	Plane	Flight Time	Exercise Practiced and Notes

New Aircraft Detailed Inspection Checklist

Electronic Gear

Servo's

- ❑ Mounting Solid and Secure?
- ❑ All Screws Installed?
- ❑ Grommets in Place?
- ❑ Servo Wheel Screws installed?
- ❑ Servo lead routing?

Switch Installation

- ❑ Solid and Secure?
- ❑ Opposite side of exhaust outlet?
- ❑ Switch lead routing?

Receiver and Battery Pack

- ❑ Mounting Solid and Secure?
- ❑ Vibration protection adequate?

Antenna

- ❑ Routing away from servo's?
- ❑ Strain Relief in fuselage?
- ❑ Extended to maximum length?
- ❑ Attachment to external surface, strain relief?

Mechanical Gear

Fuel Tank

- ❑ Determine how it is plumbed?
- ❑ Is it adequately supported?
- ❑ Has it been pressure tested?
- ❑ Vibration protection adequate? (i.e. tank wrapped in foam to prevent fuel foaming)

Engine

- ❑ Is it mounted correctly?
- ❑ Are all the mounting bolts installed?
- ❑ Are all the mounting bolts tight?
- ❑ Are the muffler bolts tight?
- ❑ Is there a pressure fitting for the fuel tank?
- ❑ Are the Prop Size and Pitch OK for the engine?
- ❑ Are all bolts and nuts tight?
- ❑ Has the propeller been balanced?
- ❑ Is the prop nut tight?
- ❑ Is the spinner on securely if fitted?

Push Rods and Linkages

- ❑ Are the push rods securely attached to the servo wheels?
- ❑ Are the push rods securely attached to the control surfaces?
- ❑ Are there keepers on the clevises if fitted?
- ❑ Are there other forms of retainers on the clevises if fitted?
- ❑ Are the push on type connectors securely attached?
- ❑ Is there adequate push rod material in the clevises?
- ❑ Are the push rods/nyrods properly supported?
- ❑ Do they rub against each other?
- ❑ Is the action smooth and with little friction?

Airframe

- ❑ Is the covering securely attached?
- ❑ Is the covering reasonably tight?
- ❑ Is the covering of high contrast for easy viewing?
- ❑ File flat spots on wheel axles for wheel collar screws?

Wing mounting and control Surfaces

- If the wing is attached with rubber bands are the dowels long enough to ensure that the bands will stay in place?
- Is there a minimum of 10 rubber bands holding the wing on?
- If mounted with bolts are the blind nuts, if used, installed correctly?
- If mounted with ¼ inch bolts are the mounting plates and wood nuts installed correctly?
- If a leading edge dowel or dowels are used are they attached securely?
- If the wing is joined in the center is it properly glued and reinforced?
- Are all of the control surfaces (i.e. rudder, ailerons, elevator) hinged appropriately – gaps and strength?

Alignment

- Is the wing centered on the fuselage?
- Is the horizontal stabilizer centered on the fuselage?
- Is the wing and stabilizer parallel with each other when viewed head on?
- Is the vertical fin at 90 degrees to the horizontal stabilizer?
- Is the main wing at 90 degrees to the center line of the fuselage?
- Is the **dry** center of gravity at the location where the plans call for?
- If not sure a good starting point would by 25 percent of the wing cord.

Aircraft Operational Inspection

Prior to performing an operational test you must pin out on the Frequency board

Control Surfaces

- Are all of the control surfaces (i.e. rudder, ailerons, elevator, nose wheel) and throttle moving in the correct directions?
- Are all of the control surfaces (i.e. rudder, ailerons, elevator) adjusted for the appropriate neutral positions?
- Do all of the control surfaces (i.e. rudder, ailerons, elevator) and throttle move freely?
- Are all of the control surfaces (i.e. rudder, ailerons, elevator, nose wheel) and throttle adjusted for the correct amount of movement/throw?

Range Test

- A range test is required to be sure that your transmitter and receiver are functioning properly.
- Are all battery packs charged?

Engine Test

- Start engine and set the needle valve for a slightly rich setting (i.e. new engines should be run slightly rich to prevent excessive engine wear/damage). Refer to you engine manual for more details.
- Check the engine for excessive vibration.
- It is good practice to perform a second range check with the engine running to ensure there are no major changes.

GOOD LUCK!

SRCFA Test For New Members And Students

The completed Wings form shall be returned to the Chief Flying Instructor (CFI).

STRATHCONA R/C FLYERS ASSOCIATION

WINGS FLIGHT TEST

STUDENTS NAME: _____

To ensure the safety of all club members new pilots must qualify before solo flight. Minimum proficiency for solo flight must be demonstrated to an instructor. The requirements for solo flight are laid out in the club training manual. A solo card will be presented to the student when these requirements are met.

To qualify as a "SRCFA Wings Pilot" the following requirements must be demonstrated to an SRCFA instructor who will then initial the requirement. The requirements must be met in a maximum of two flights. The requirements can be performed in any order at the discretion of the instructor giving the test. When all requirements have been met this form should be signed off by the SRCFA instructor. ***The new pilot will be presented with his or her "SRCFA Wings Pilot" pin when this form is given to the Chief Flying Instructor.***

Instructor: _____

Initials		Requirement.
_____	1.	Taxi and ground handling; - show ability to control the aircraft on the ground. Including safe operating procedures and adherence to club rules.
_____	2.	Take-off; - announce intention.
_____	3.	Procedure Turn; - 90 degree turns straight and level flight, left and right turns. Traffic pattern familiarization. (maintain enough altitude for a safe recovery).
_____	4.	Circle around a point;- climb to altitude and maintain while circling, both left and right.
_____	5.	Figure eight; - maintain altitude, center the crossover point at the same place.
_____	6.	Slow flight;- minimum power setting, maintain altitude.
_____	7.	Stall and recovery;- climb to a safe altitude, stall the aircraft, resume straight and level flight.
_____	8.	Gliding; - climb to a safe altitude, reduce power to idle, glide to a safe height. Resume normal flight.
_____	9.	Demonstrate a simulated (throttle at idle) dead stick landing to a runway
_____	10.	Traffic pattern;- fly both left and right patterns.
_____	11.	Three touch and goes in a single flight..
_____	12.	Landing under power and taxi back to shut down area.
_____	13	Check flights, demonstrating 1 - 12 above in no more than two flights.

Approval For Wings _____ DATE _____
Instructor

Wings Presented _____ DATE _____
Instructor

Please return this completed form to the Chief Flying Instructor

Section 7

Index